

APPENDIX G

Fluvial Geomorphology

For figures, tables, and text from Rosgen applied to this portion of the study, especially pages 5-6, 6-29, 6-30, and 8-9, refer to: Rosgen. D. L. 1996. Applied River Morphology. Printed Media Companies, Minneapolis, Minnesota.

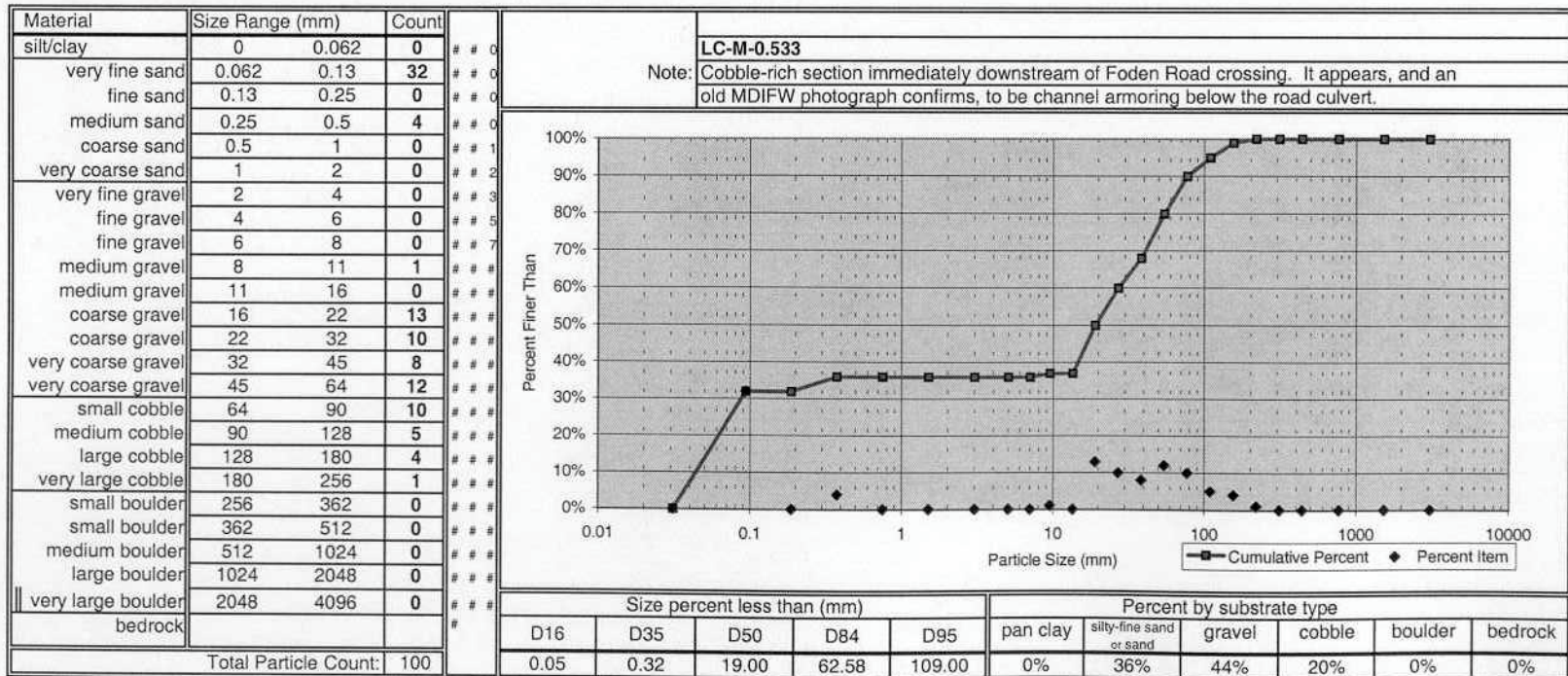
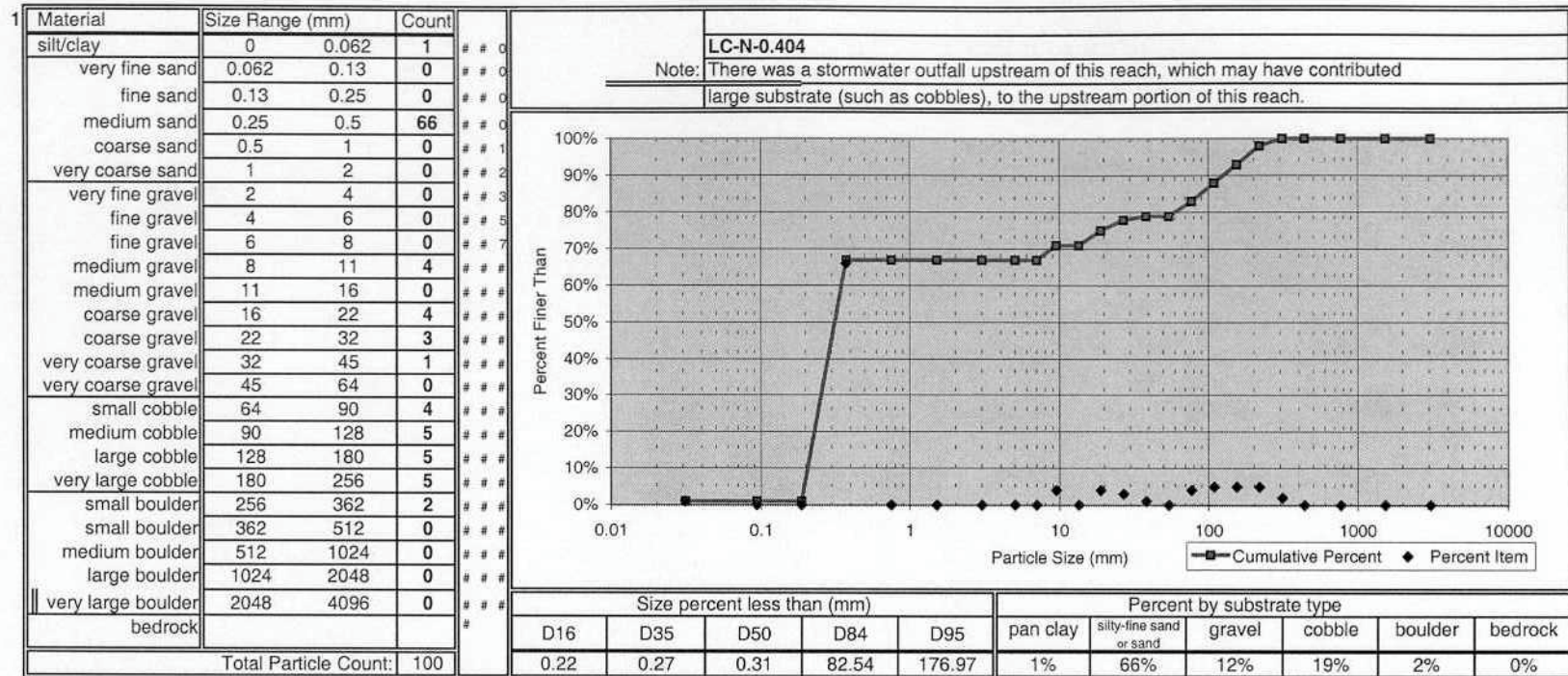
Appendix G-1. Pebble count data for various sites throughout the Long Creek and Red Brook watersheds. Note: These sites were included in the counts to show the range of conditions found throughout the watersheds, and they were not intended to be representative of the actual proportion of sites in the study watersheds having various types of stream bottom material characteristics.

Definition of Terms for Pebble Counts Made in the Long Creek & Red Brook Watersheds

<u>Category Observed in the Field</u>	<u>Abbreviation</u>	<u>Approximate Size Class*</u>
Sand	SA	0.0380 cm
Fine-Sand/Silt/Clay mix	SC	~0.0100 cm
Clay (solid)	C	~0.0050 cm
Bedrock	BR	Don't use to calculate mean particle size, but do use in particle-size-distribution discussion

Note: Because pebble counts were used as the field technique to characterize the substrate of these streams, as opposed to doing sieve analyses of stream bottom materials, these general definitions were used to categorize basic types of materials encountered in the field.

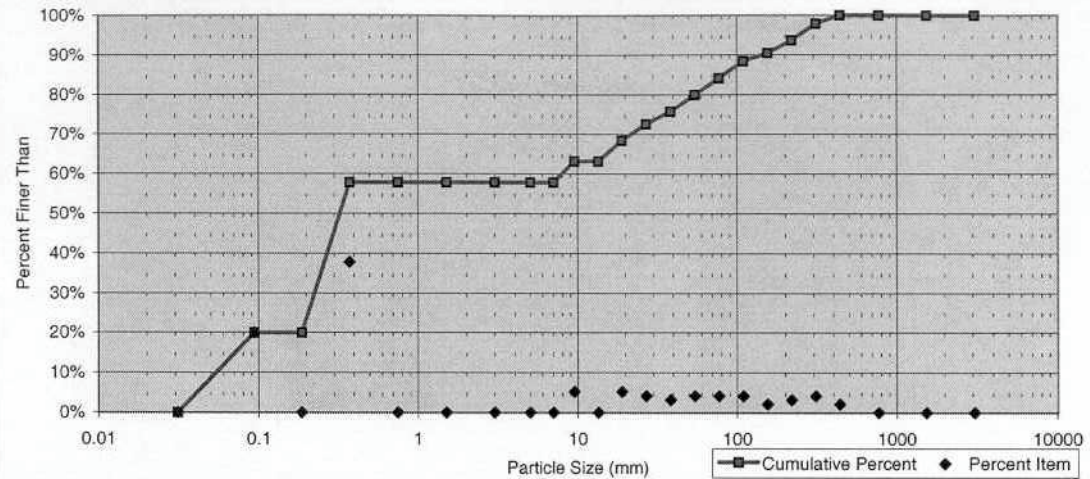
*Mean particle size for specified category, as defined in Rosgen 1996

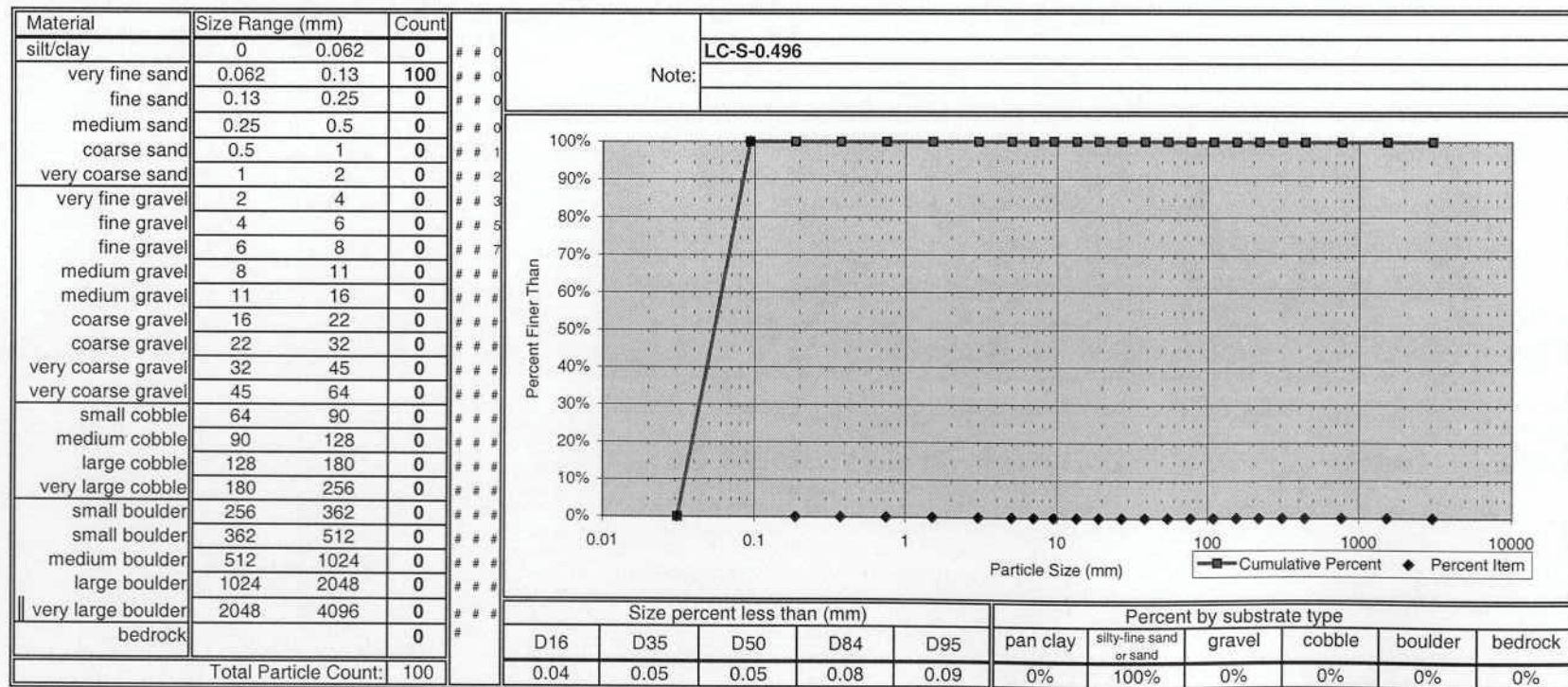
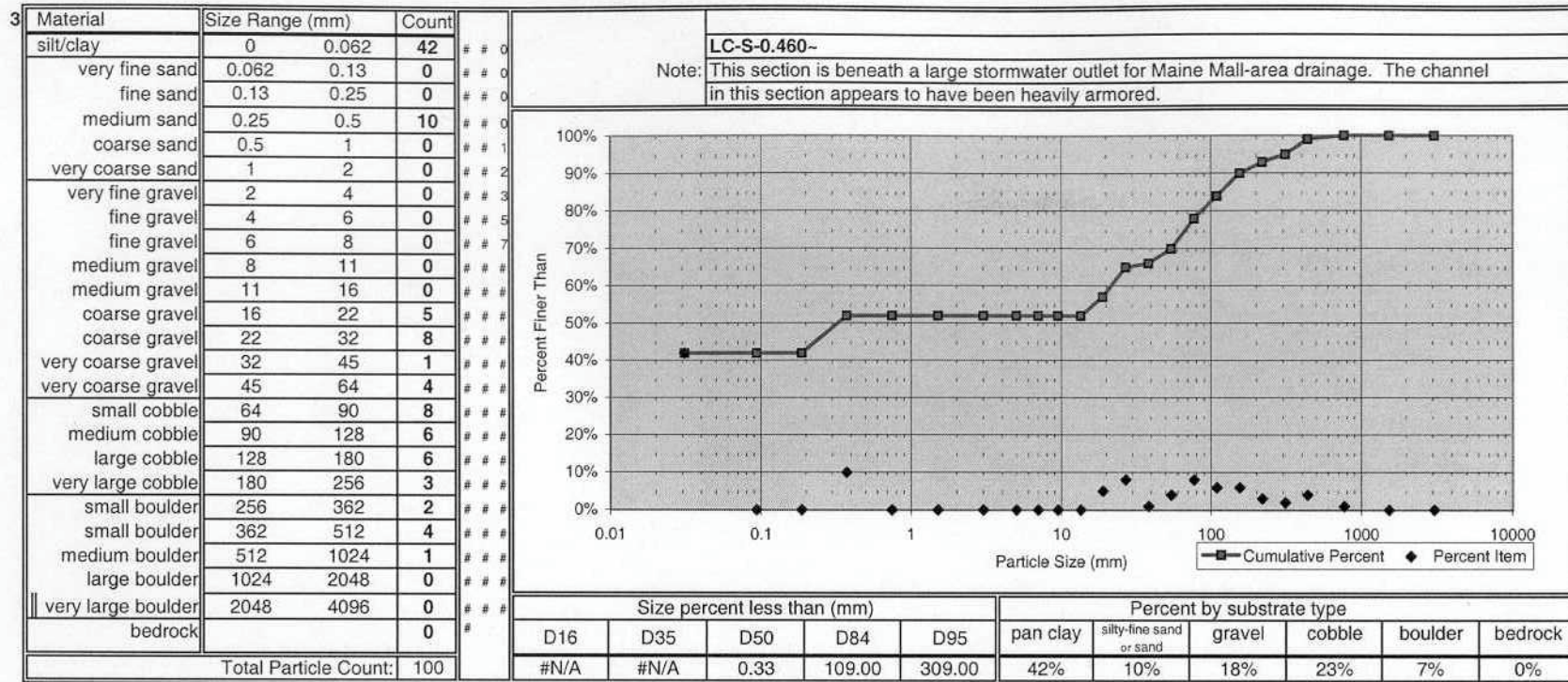


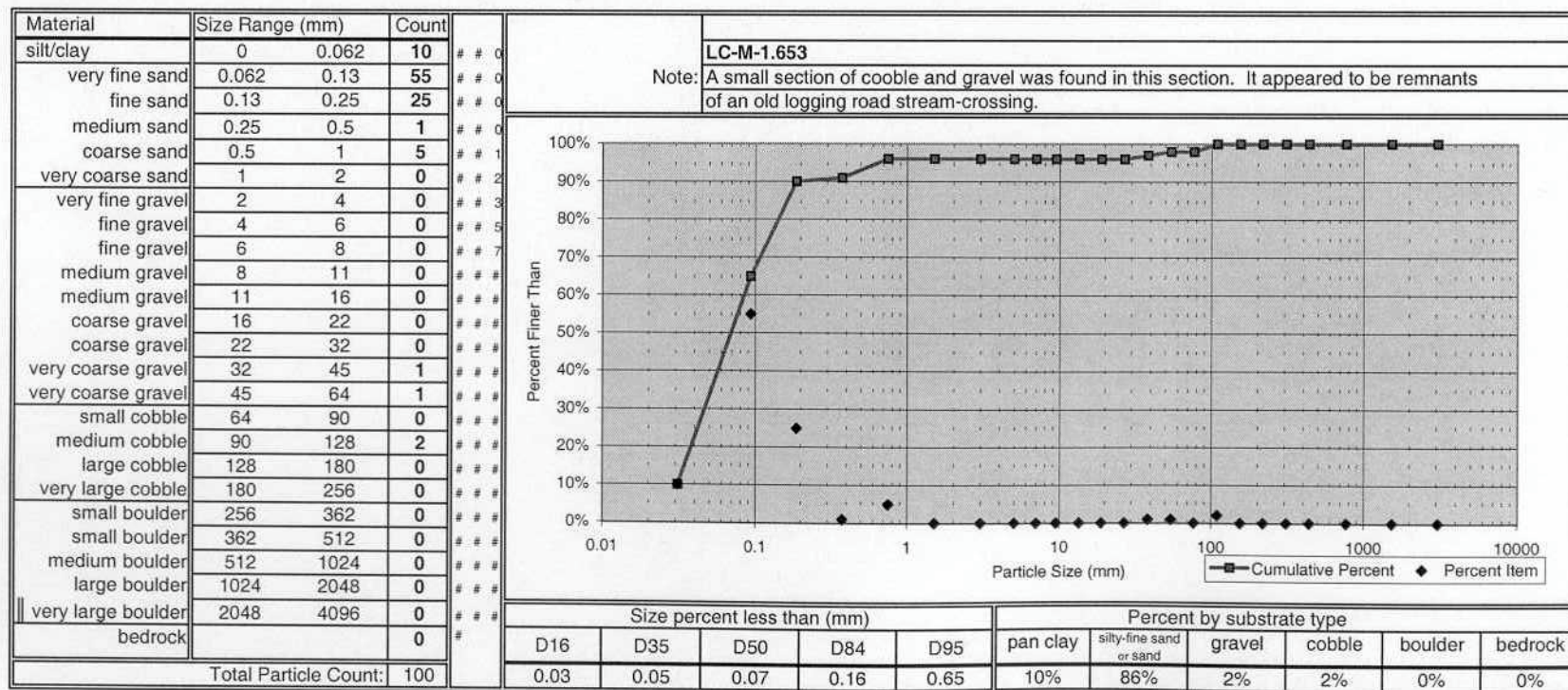
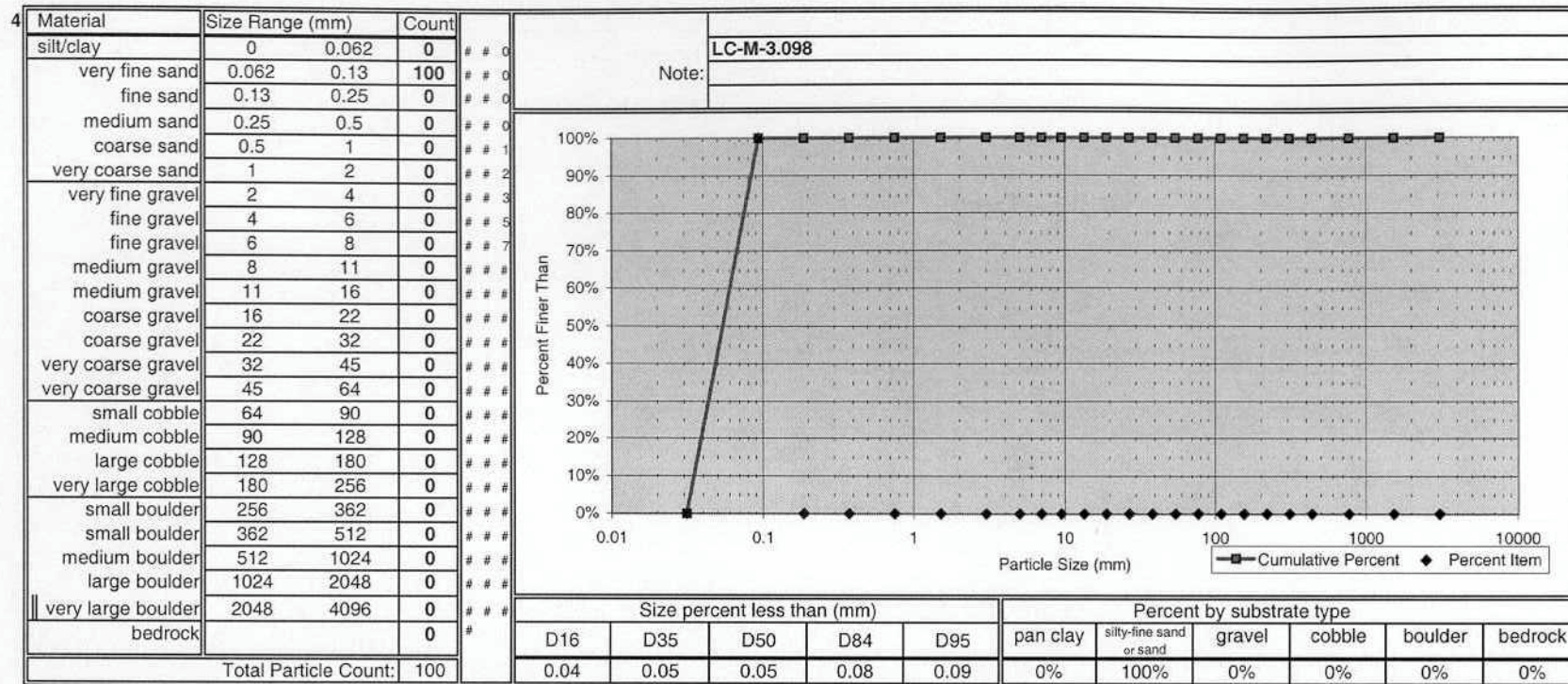
Material	Size Range (mm)		Count	
silt/clay	0	0.062	0	## 0
very fine sand	0.062	0.13	19	## 0
fine sand	0.13	0.25	0	## 0
medium sand	0.25	0.5	36	## 0
coarse sand	0.5	1	0	## 1
very coarse sand	1	2	0	## 2
very fine gravel	2	4	0	## 3
fine gravel	4	6	0	## 5
fine gravel	6	8	0	## 7
medium gravel	8	11	5	## 8
medium gravel	11	16	0	## 8
coarse gravel	16	22	5	## 8
coarse gravel	22	32	4	## 8
very coarse gravel	32	45	3	## 8
very coarse gravel	45	64	4	## 8
small cobble	64	90	4	## 8
medium cobble	90	128	4	## 8
large cobble	128	180	2	## 8
very large cobble	180	256	3	## 8
small boulder	256	362	4	## 8
small boulder	362	512	2	## 8
medium boulder	512	1024	0	## 8
large boulder	1024	2048	0	## 8
very large boulder	2048	4096	0	## 8
bedrock			5	##
Total Particle Count:			100	

LC-M-0.432

Note: This site is about 100 m downstream of a culvert. There does appear to be some exposed ledge in this area, which may be responsible for the presence of bedrock, boulder, and cobble values.



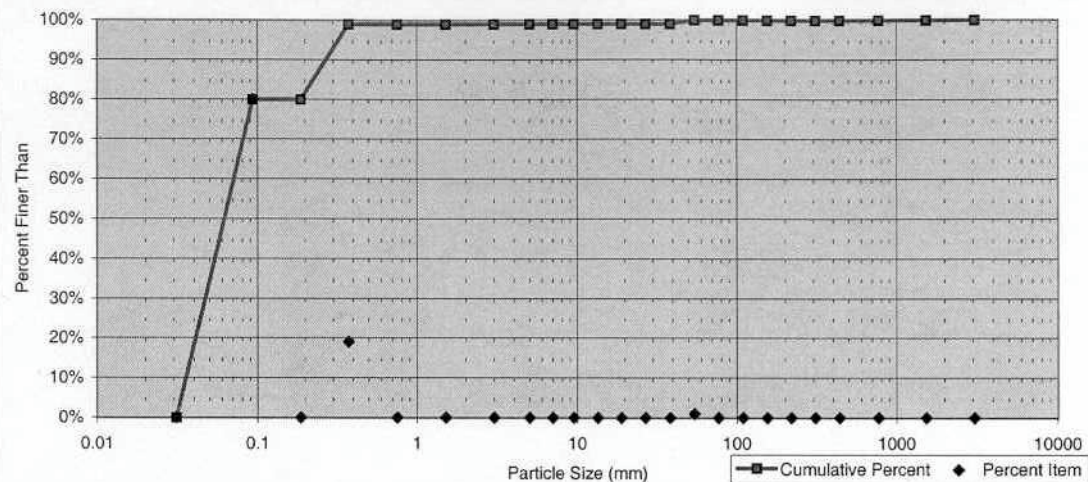




Material	Size Range (mm)		Count	
silt/clay	0	0.062	0	## 0
very fine sand	0.062	0.13	80	## 0
fine sand	0.13	0.25	0	## 0
medium sand	0.25	0.5	19	## 0
coarse sand	0.5	1	0	## 1
very coarse sand	1	2	0	## 2
very fine gravel	2	4	0	## 3
fine gravel	4	6	0	## 5
fine gravel	6	8	0	## 7
medium gravel	8	11	0	## 8
medium gravel	11	16	0	## 9
coarse gravel	16	22	0	## 9
coarse gravel	22	32	0	## 9
very coarse gravel	32	45	0	## 9
very coarse gravel	45	64	1	## 9
small cobble	64	90	0	## 9
medium cobble	90	128	0	## 9
large cobble	128	180	0	## 9
very large cobble	180	256	0	## 9
small boulder	256	362	0	## 9
small boulder	362	512	0	## 9
medium boulder	512	1024	0	## 9
large boulder	1024	2048	0	## 9
very large boulder	2048	4096	0	## 9
bedrock			0	##
Total Particle Count:			100	

LC-M-0.603

Note: This section was upstream of the area where the channel had been filled in by large amount of riprap from adjacent streambanks (likely placed to protect the footbridge infrastructure here).

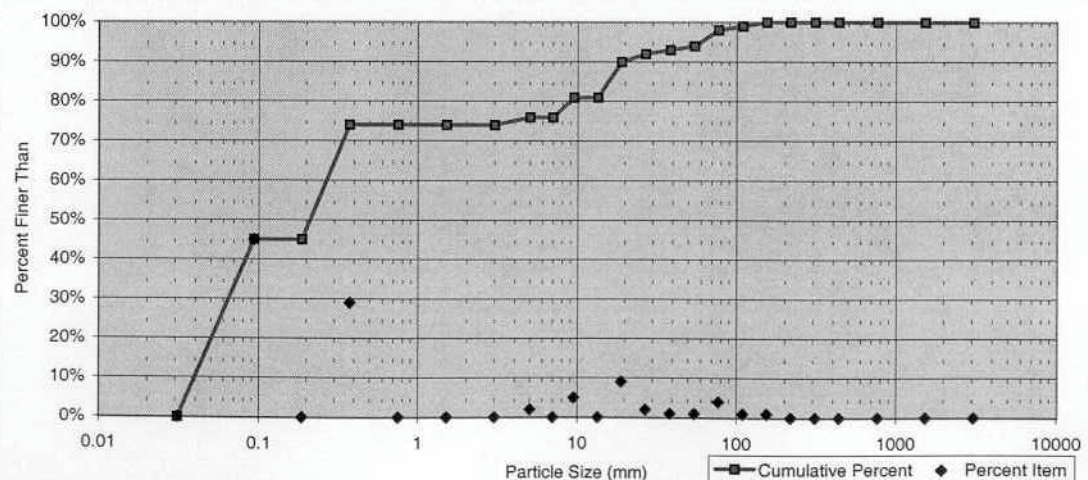


Size percent less than (mm)					Percent by substrate type					
D16	D35	D50	D84	D95	pan clay	silty-fine sand or sand	gravel	cobble	boulder	bedrock
0.04	0.05	0.06	0.22	0.32	0%	99%	1%	0%	0%	0%

Material	Size Range (mm)		Count	
silt/clay	0	0.062	0	## 0
very fine sand	0.062	0.13	45	## 0
fine sand	0.13	0.25	0	## 0
medium sand	0.25	0.5	29	## 0
coarse sand	0.5	1	0	## 1
very coarse sand	1	2	0	## 2
very fine gravel	2	4	0	## 3
fine gravel	4	6	2	## 5
fine gravel	6	8	0	## 7
medium gravel	8	11	5	## 8
medium gravel	11	16	0	## 9
coarse gravel	16	22	9	## 9
coarse gravel	22	32	2	## 9
very coarse gravel	32	45	1	## 9
very coarse gravel	45	64	1	## 9
small cobble	64	90	4	## 9
medium cobble	90	128	1	## 9
large cobble	128	180	1	## 9
very large cobble	180	256	0	## 9
small boulder	256	362	0	## 9
small boulder	362	512	0	## 9
medium boulder	512	1024	0	## 9
large boulder	1024	2048	0	## 9
very large boulder	2048	4096	0	## 9
bedrock			0	##
Total Particle Count:			100	

LC-N-0.595

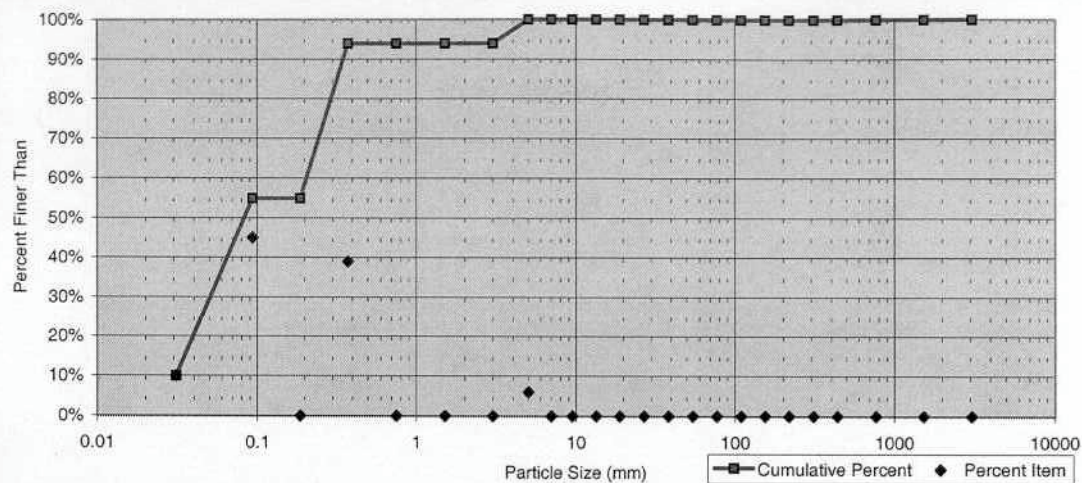
Note: Rubble in the stream may exist as a result of adjacent floodplain filling activities.



Size percent less than (mm)					Percent by substrate type					
D16	D35	D50	D84	D95	pan clay	silty-fine sand or sand	gravel	cobble	boulder	bedrock
0.05	0.07	0.21	15.13	59.42	0%	74%	20%	6%	0%	0%

Material	Size Range (mm)		Count	
silt/clay	0	0.062	10	## 0
very fine sand	0.062	0.13	45	## 0
fine sand	0.13	0.25	0	## 0
medium sand	0.25	0.5	39	## 0
coarse sand	0.5	1	0	## 1
very coarse sand	1	2	0	## 2
very fine gravel	2	4	0	## 3
fine gravel	4	6	6	## 5
fine gravel	6	8	0	## 7
medium gravel	8	11	0	## 8
medium gravel	11	16	0	## 9
coarse gravel	16	22	0	## 10
coarse gravel	22	32	0	## 11
very coarse gravel	32	45	0	## 12
very coarse gravel	45	64	0	## 13
small cobble	64	90	0	## 14
medium cobble	90	128	0	## 15
large cobble	128	180	0	## 16
very large cobble	180	256	0	## 17
small boulder	256	362	0	## 18
small boulder	362	512	0	## 19
medium boulder	512	1024	0	## 20
large boulder	1024	2048	0	## 21
very large boulder	2048	4096	0	## 22
bedrock			0	##
Total Particle Count:			100	

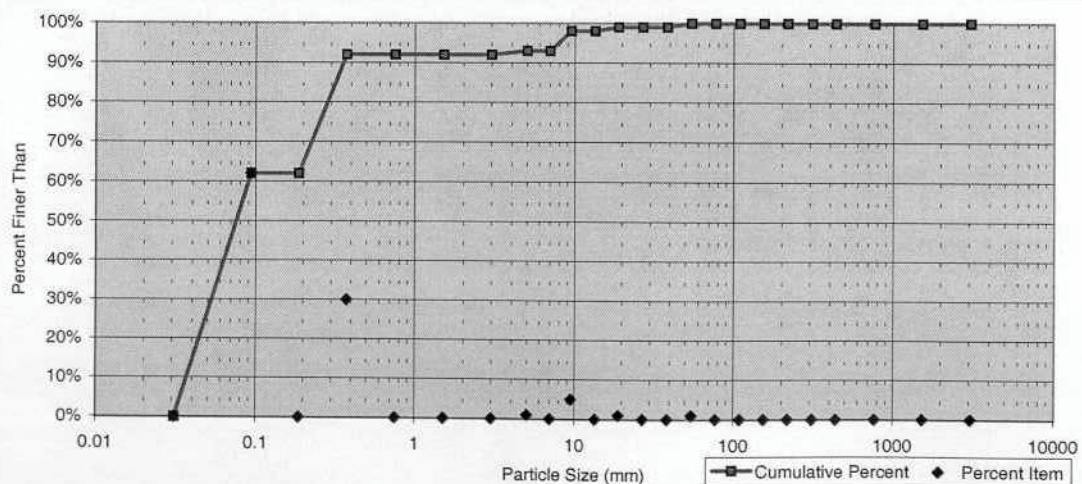
Note: LC-M-0.910



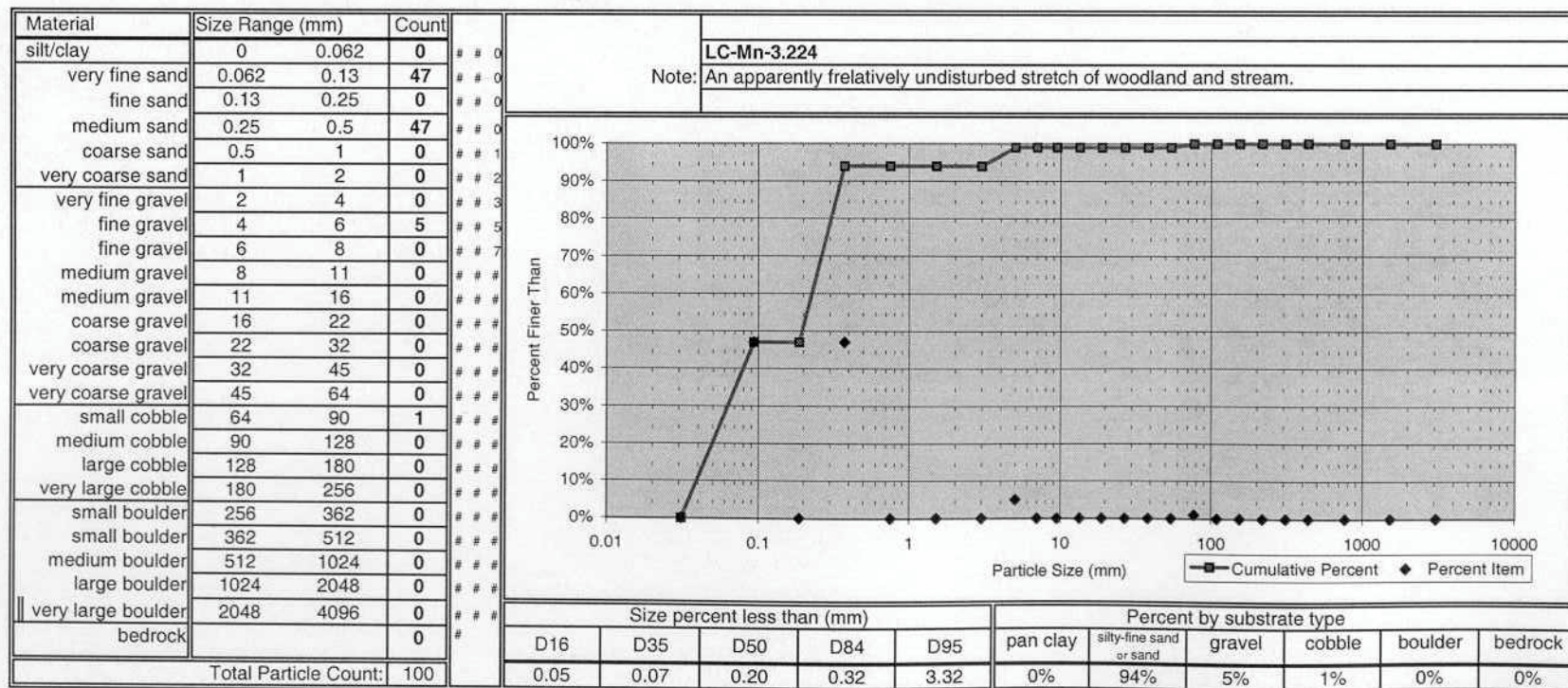
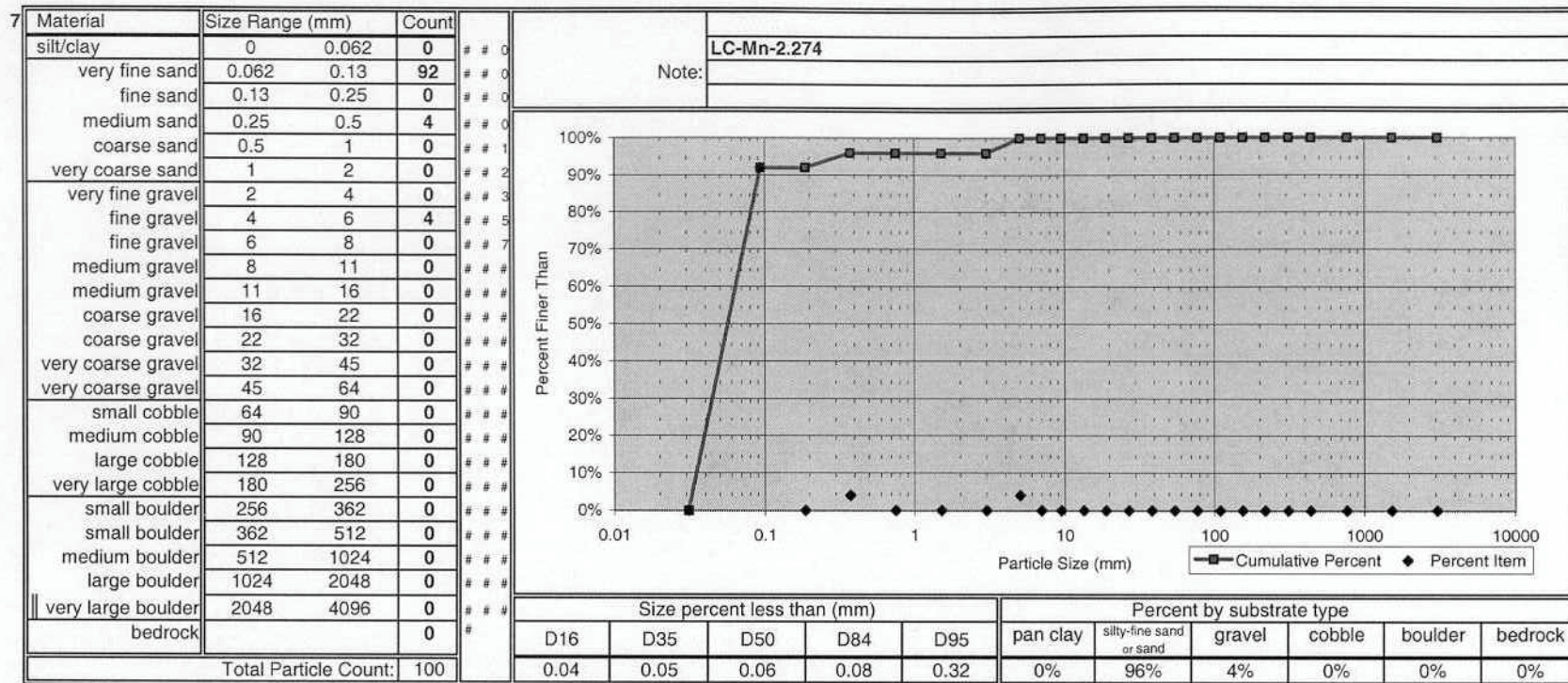
Size percent less than (mm)					Percent by substrate type					
D16	D35	D50	D84	D95	pan clay	silty-fine sand or sand	gravel	cobble	boulder	bedrock
0.04	0.06	0.08	0.31	3.27	10%	84%	6%	0%	0%	0%

Material	Size Range (mm)		Count	
silt/clay	0	0.062	0	## 0
very fine sand	0.062	0.13	62	## 0
fine sand	0.13	0.25	0	## 0
medium sand	0.25	0.5	30	## 0
coarse sand	0.5	1	0	## 1
very coarse sand	1	2	0	## 2
very fine gravel	2	4	0	## 3
fine gravel	4	6	1	## 5
fine gravel	6	8	0	## 7
medium gravel	8	11	5	## 8
medium gravel	11	16	0	## 9
coarse gravel	16	22	1	## 10
coarse gravel	22	32	0	## 11
very coarse gravel	32	45	0	## 12
very coarse gravel	45	64	1	## 13
small cobble	64	90	0	## 14
medium cobble	90	128	0	## 15
large cobble	128	180	0	## 16
very large cobble	180	256	0	## 17
small boulder	256	362	0	## 18
small boulder	362	512	0	## 19
medium boulder	512	1024	0	## 20
large boulder	1024	2048	0	## 21
very large boulder	2048	4096	0	## 22
bedrock			0	##
Total Particle Count:			100	

Note: LC-N-1.000 --
A small stretch of pea gravel was found in this section.

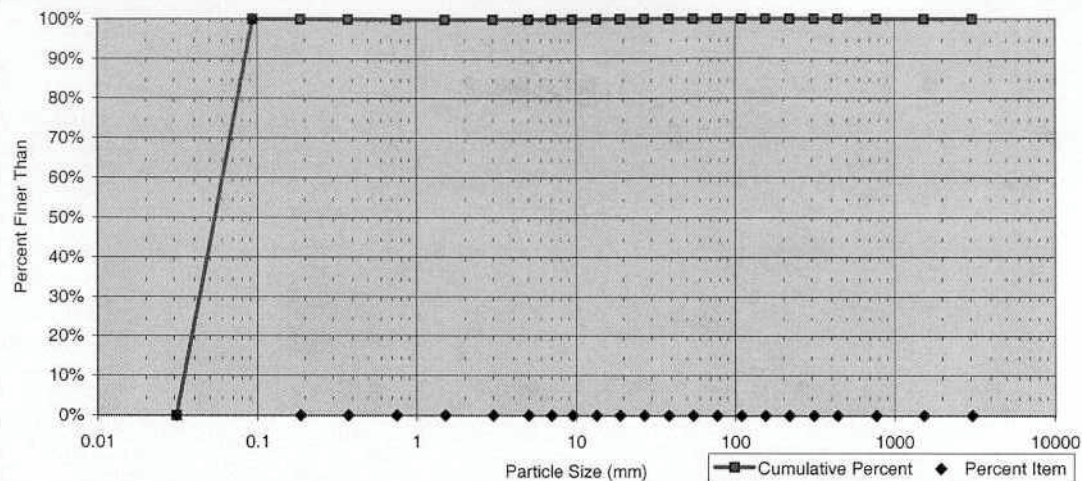


Size percent less than (mm)					Percent by substrate type					
D16	D35	D50	D84	D95	pan clay	silty-fine sand or sand	gravel	cobble	boulder	bedrock
0.04	0.06	0.08	0.31	7.91	0%	92%	8%	0%	0%	0%



Material	Size Range (mm)		Count
silt/clay	0	0.062	0
very fine sand	0.062	0.13	100
fine sand	0.13	0.25	0
medium sand	0.25	0.5	0
coarse sand	0.5	1	0
very coarse sand	1	2	0
very fine gravel	2	4	0
fine gravel	4	6	0
fine gravel	6	8	0
medium gravel	8	11	0
medium gravel	11	16	0
coarse gravel	16	22	0
coarse gravel	22	32	0
very coarse gravel	32	45	0
very coarse gravel	45	64	0
small cobble	64	90	0
medium cobble	90	128	0
large cobble	128	180	0
very large cobble	180	256	0
small boulder	256	362	0
small boulder	362	512	0
medium boulder	512	1024	0
large boulder	1024	2048	0
very large boulder	2048	4096	0
bedrock			0
Total Particle Count:			100

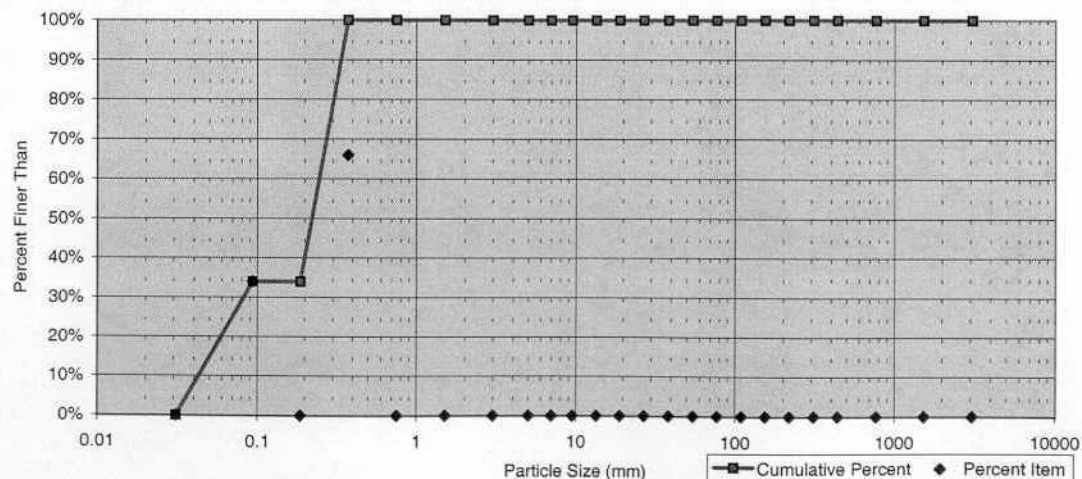
Note: LC-Mw-2.896



Size percent less than (mm)					Percent by substrate type					
D16	D35	D50	D84	D95	pan clay	silty-fine sand or sand	gravel	cobble	boulder	bedrock
0.04	0.05	0.05	0.08	0.09	0%	100%	0%	0%	0%	0%

Material	Size Range (mm)		Count
silt/clay	0	0.062	0
very fine sand	0.062	0.13	34
fine sand	0.13	0.25	0
medium sand	0.25	0.5	66
coarse sand	0.5	1	0
very coarse sand	1	2	0
very fine gravel	2	4	0
fine gravel	4	6	0
fine gravel	6	8	0
medium gravel	8	11	0
medium gravel	11	16	0
coarse gravel	16	22	0
coarse gravel	22	32	0
very coarse gravel	32	45	0
very coarse gravel	45	64	0
small cobble	64	90	0
medium cobble	90	128	0
large cobble	128	180	0
very large cobble	180	256	0
small boulder	256	362	0
small boulder	362	512	0
medium boulder	512	1024	0
large boulder	1024	2048	0
very large boulder	2048	4096	0
bedrock			0
Total Particle Count:			100

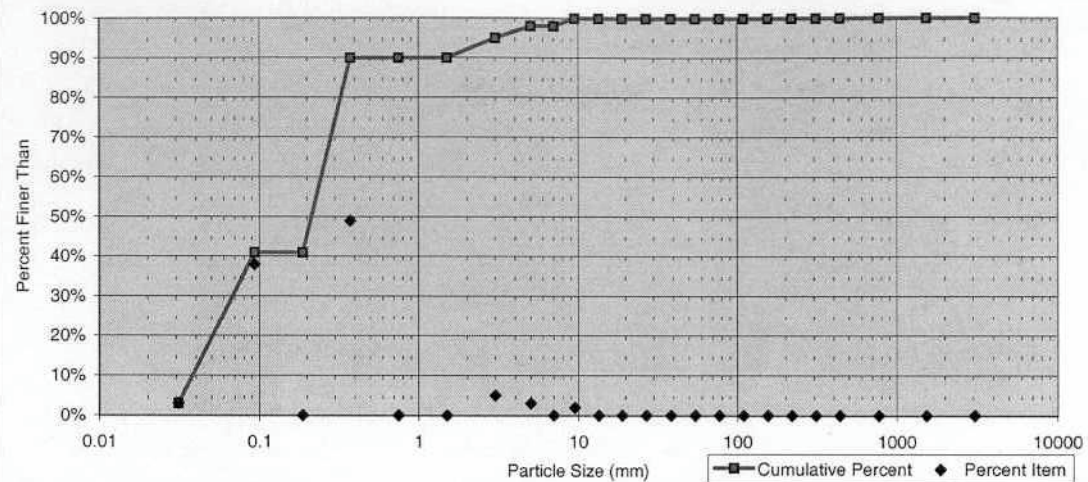
Note: RB-1.434



Size percent less than (mm)					Percent by substrate type					
D16	D35	D50	D84	D95	pan clay	silty-fine sand or sand	gravel	cobble	boulder	bedrock
0.05	0.19	0.22	0.32	0.36	0%	100%	0%	0%	0%	0%

Material	Size Range (mm)		Count	
silt/clay	0	0.062	3	# # 0
very fine sand	0.062	0.13	38	# # 0
fine sand	0.13	0.25	0	# # 0
medium sand	0.25	0.5	49	# # 0
coarse sand	0.5	1	0	# # 1
very coarse sand	1	2	0	# # 2
very fine gravel	2	4	5	# # 3
fine gravel	4	6	3	# # 5
fine gravel	6	8	0	# # 7
medium gravel	8	11	2	# # #
medium gravel	11	16	0	# # #
coarse gravel	16	22	0	# # #
coarse gravel	22	32	0	# # #
very coarse gravel	32	45	0	# # #
very coarse gravel	45	64	0	# # #
small cobble	64	90	0	# # #
medium cobble	90	128	0	# # #
large cobble	128	180	0	# # #
very large cobble	180	256	0	# # #
small boulder	256	362	0	# # #
small boulder	362	512	0	# # #
medium boulder	512	1024	0	# # #
large boulder	1024	2048	0	# # #
very large boulder	2048	4096	0	# # #
bedrock			0	#
Total Particle Count:			100	

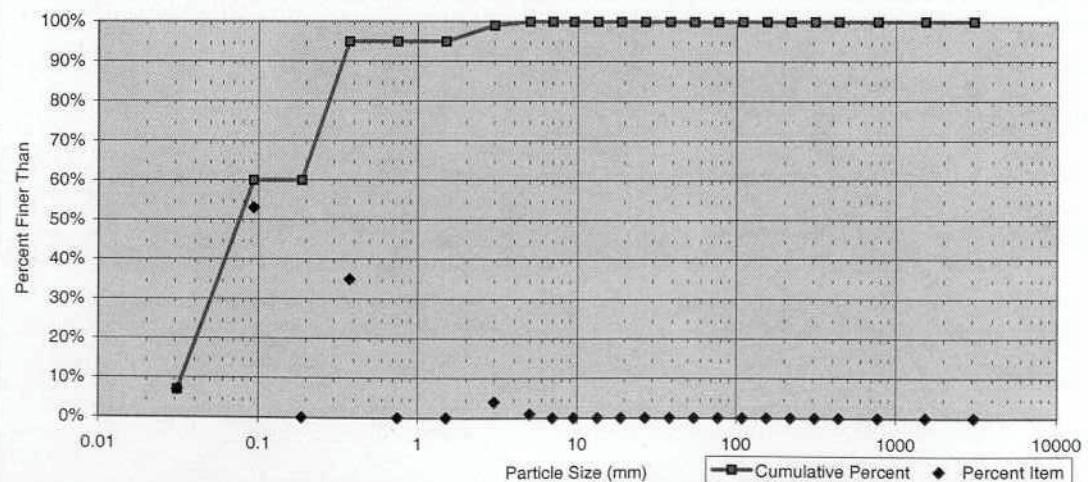
Note: RB-2.119



Size percent less than (mm)					Percent by substrate type					
D16	D35	D50	D84	D95	pan clay	silty-fine sand or sand	gravel	cobble	boulder	bedrock
0.05	0.08	0.21	0.34	3.00	3%	87%	10%	0%	0%	0%

Material	Size Range (mm)		Count	
silt/clay	0	0.062	7	# # 0
very fine sand	0.062	0.13	53	# # 0
fine sand	0.13	0.25	0	# # 0
medium sand	0.25	0.5	35	# # 0
coarse sand	0.5	1	0	# # 1
very coarse sand	1	2	0	# # 2
very fine gravel	2	4	4	# # 3
fine gravel	4	6	1	# # 5
fine gravel	6	8	0	# # 7
medium gravel	8	11	0	# # #
medium gravel	11	16	0	# # #
coarse gravel	16	22	0	# # #
coarse gravel	22	32	0	# # #
very coarse gravel	32	45	0	# # #
very coarse gravel	45	64	0	# # #
small cobble	64	90	0	# # #
medium cobble	90	128	0	# # #
large cobble	128	180	0	# # #
very large cobble	180	256	0	# # #
small boulder	256	362	0	# # #
small boulder	362	512	0	# # #
medium boulder	512	1024	0	# # #
large boulder	1024	2048	0	# # #
very large boulder	2048	4096	0	# # #
bedrock			0	#
Total Particle Count:			100	

Note: RB-3.961



Size percent less than (mm)					Percent by substrate type					
D16	D35	D50	D84	D95	pan clay	silty-fine sand or sand	gravel	cobble	boulder	bedrock
0.04	0.06	0.08	0.30	0.38	7%	88%	5%	0%	0%	0%